

Listing of the claims:

1. (Canceled)
2. (Canceled)
3. (Canceled)
4. (Canceled)
5. (Canceled)
6. (Canceled)
7. (Canceled)
8. (Canceled)
9. (Canceled)
10. (Canceled)
11. (Canceled)
12. (Canceled)

13. (New) An axially flexible robot line routing apparatus for use with a robot arm having an axial path for the line, the routing apparatus comprising:

a wrist having a first member concentrically attached to the robot arm along the axial path and rotatably moveable with respect to the arm about the axial path,

a conduit concentrically positioned in the wrist along the axial path; and

at least one robot line positioned in the conduit in a helical orientation with respect to itself along the axial path to allow extension or compression of the line along the axial path.

14. (New) The apparatus of claim 13 further comprises a plurality of wrist members concentrically attached to the robot arm along the axial path and rotatably moveable with respect to one another about the axial path.

15. (New) The apparatus of claim 13 further comprising a mounting plate positioned between and attached to the robot arm and the wrist having a through hole concentrically positioned along the axial path.

16. (New) The apparatus of claim 13 wherein the at least one line comprises a plurality of lines, at least one of such lines wrapped around the other lines along the axial path.

17. (New) The apparatus of claim 13 further comprising a bellows attached to the mounting plate and the line axially distant from the conduit and concentrically positioned around a portion of the line along the axial path.

18. (New) The apparatus of claim 17 wherein the bellows comprises a plurality of bellows, each line having a separate bellows.

19. (New) The apparatus of claim 17 wherein the bellows sealingly engages the conduit through sealing attachment of the bellows to the mounting plate and the line.

20. (New) The apparatus of claim 17 further comprising a guide plate positioned concentrically around the line having a peripheral surface engaged by the bellows through a spring retainer opposite the mounting plate along the axial path.

21. (New) The apparatus of claim 17 further comprising an attaching flange for attaching the bellows to the mounting plate.

22. (New) The apparatus of claim 17 wherein the bellows is axially displaceable with respect to the mounting plate along the axial path to accommodate axial displacement of the line.

23. (New) The apparatus of claim 17 further comprising a nipple threadingly engaged to the mounting plate for engaging receipt of the bellows.

24. (New) the apparatus of claim 16 wherein the bellows is made from at least one of natural rubber, styrene butadiene rubber, acrylic nitrile rubber, chlorobutadiene rubber, fluorine rubber or polychlorotetrafluoroethylene.

25. (New) The apparatus of claim 22 wherein the bellows is displaceable along the axis in a range of about 5mm. to 30mm.

26. (New) An axially flexible robot line routing apparatus for use in routing lines in an axially path from a robot arm through a wrist comprising:  
a wrist attached to the arm and rotatable with respect to the arm along the axial path;  
a conduit concentrically positioned in the wrist along the axial path;  
a mounting plate positioned between the robot arm and the wrist having a through hole along the axial path;  
at least one robot line passing from the robot arm through the mounting plate hole and the conduit along the axial path, the line positioned in a helical orientation to itself along the axial path; and  
an axially displaceable bellows concentrically attached to the line and the mounting plate axially distant from the wrist encompassing a portion of the line.

27. (New) The apparatus of claim 26 wherein the bellows sealingly engages the conduit through sealing attachment of the bellows to the mounting plate and the line.

28. (New) The apparatus of claim 26 further comprising a flange positioned in concentric overlapping relation with a portion of the bellows for sealing engagement of the bellows to the mounting plate.

29. (New) The apparatus of claim 26 wherein the at least one robot line comprises a plurality of lines, each line having a bellows in sealing engagement with the line and the mounting plate.

30. (New) The apparatus of claim 26 further comprising a guide plate concentrically and sealingly engaged to the line opposite the mounting plate.

31. (New) The apparatus of claim 26 wherein the at least one line comprises a plurality of lines, at least one of the lines in helical wrapped orientation to the other lines along the axial path.

32. (New) An axially flexible robot line routing apparatus for routing lines through a robot arm and a wrist along an axial path, the apparatus comprising:

a wrist concentrically mounted to the arm and rotatable with respect to the arm about the axial path;

a conduit positioned in the wrist along at least a portion of the axial path;

a connecting piece positioned between and attached to the robot arm and the wrist having at least one through hole along the axial path;

a mounting plate attached to the connecting piece adjacent the robot arm having at least one hole in concentric alignment with the connecting piece hole;

an axially displaceable bellows concentrically attached to and in sealing engagement to the mounting plate adjacent the robot arm along the axial path; and

at least two robot lines passing through the robot arm and in sealing engagement with the bellows, the lines positioned in helical wrapped relationship with respect to one another in the conduit along the axial path permitting axial extension and compression of the lines along the axial path.